CHAPTER 15

PC 2001 Printers

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NOTE to REVIEWERS: This is a very early draft version, and no effort has been made to reconcile changes in cross references to other chapters in the guide. Please look for comments such as this in the draft, which encourage your feedback on specific issues.

Please submit comments using the form on http://www.pcdesguide.org or by sending e-mail to comments@pcdesguide.org.

IMPORTANT: The requirements defined in this guide provide guidelines for designing PC systems that will result in an optimal user experience with typical Windows-based applications running under either the Microsoft Windows 98 "Millennium" or later or Windows 2000 Professional or later operating systems. These design guidelines are not the basic system requirements for running any version of Windows operating systems.

Contents

This chapter presents the PC 2001 requirements~~and recommendations~~ for printers.~~Printers and other devices attached to parallel ports should be capable of high-speed, bi-directional data transfers. The design criteria for parallel devices follows the design criteria for parallel ports as described in "Parallel Port Requirements" in Chapter 13, "I/O Ports and Devices."~~

The goal of the PC 2001 requirements for printers~~and parallel ports~~ is to ensure the following:

?? Maximum speed for transfer of~~parallel~~ data between the system and the peripheral

?? A true Plug and Play experience for users

?? High-quality color matching between display and color output devices

Basic Printer Features

This section summarizes the basic PC 2001 hardware requirements for printers.

[NEW] Device uses PC 2001 compatible port connection with USB or IEEE 1394 connection

All printers must use PC 2001 compatible port connections.

PC 2001 requires the use of either USB or IEEE 1394 for printers. No proprietary solutions are acceptable for PC 2001. Other port connections may be present on the device, but the port connection must be PC 2001 compatible.

USB printers must conform to the *Universal Serial Bus Device Class Definition for Printing Devices, Version 1.1* or later.

If an IEEE 1284 or serial port connection is included on the printer, that connection must meet the requirements defined in *Legacy Plug and Play Guidelines* (http://www.pcdesguide.org/library.htm), which defines the requirements for these connections contained in earlier versions of the system design guide.

[21.1.] [REDUNDANT]IEEE 1394 Printer meets PC 2001 requirements for IEEE 1394

Note to Reviewers: Redundant with general rqmt that a device has to meet the basic requirements for its connection

[21.2.] [REDUNDANT]USB Printer meets PC 2001 requirements for USB devices

Note to Reviewers: Redundant with general rqmt that a device has to meet the basic requirements for its connection

[21.3.] [REDUNDANT]IEEE 1284 Printer supports compatibility mode, nibble mode, and ECP, compliant with IEEE 1284-I

Note to Reviewers: Redundant with general rqmt that a device has to meet the basic requirements for its connection

[21.4.] [REDUNDANT]IEEE 1284 printer meets IEEE 1284-II requirements

Note to Reviewers: Redundant w/ “legacy PnP” rqmt

[21.5.] [REDUNDANT]ECP printer works correctly when ECP mode is turned off

Note to Reviewers: Redundant w/ “legacy PnP” rqmt

[21.6.] [REDUNDANT]IEEE 1284 hardware supports error notification

Note to Reviewers: Redundant w/ "legacy PnP" rqmt

[21.7] Daisy-chained parallel port device is Plug and Play capable

The daisy-chained parallel port device must be capable of answering Plug and Play requests from the host. Because of end-of-chain issues with IEEE 1284 and IEEE 1284.3,~~it is also required that~~ all pass-through devices must comply with IEEE 1284.3.

[21.8] Network printer supports standard port monitor

Network-connected printers must support TCP/IP standards such as Line Printer Remote (LPR) and Line Printer Daemon (LPD) (RFC 1179), Port 9100 printing (raw mode printing), or both types.

PC 2001 Printer Design

This section summarizes requirements related to the PC 2001 design initiatives in ~~Part 1 of~~Part [X] of this guide.

Plug and Play for Printers

The items in this section are requirements for Plug and Play capabilities. For Plug and Play requirements related to the printer port on the PC, see Chapter ~~13,~~[X], "I/O Ports and Devices," or the related bus port requirements in ~~Part 3~~Part [X] of this guide.

[21.9] Plug and Play support implemented for all supported buses

Complete Plug and Play support must be implemented for all buses that the device supports. Each print device must have a unique Plug and Play ID. For information about the Plug and Play ~~requirements, see the related bus class definitions in Part 3 of this guide.~~requirements. See *Legacy Plug and Play Guidelines* available at http://www.pcdesguide.org/library.htm.

Note to Reviewers: The *Legacy Plug and Play Guidelines* are not yet available here.

[21.10.] [REDUNDANT]Peripheral device meets IEEE 1284 requirements

Note to Reviewers: Redundant w/ "legacy PnP" rqmt

Device Drivers and Installation for Printers

This section summarizes device driver requirements for printers. The items in this section are requirements for all PC 2001 systems.

[21.11] Printer INF file and installation meet PC 2001 requirements

Each device requires a printer INF file for both Windows 98 and Windows 2000 operating systems. The manufacturer does not need to supply a printer INF file if a standard printer INF file provided with the operating system can be used.

If the manufacturer provides an INF file, it must be complete and free of errors. This INF file must comply with the printer-specific extensions listed in the Windows 98 DDK and Windows 2000 DDK and requirement xxx.

~~If the manufacturer supplies an INF file or another file, it must comply with 3.16, "Device driver and installation meet PC 2001 requirements."~~

Note to Reviewers: This item will be xreferenced with the guideline that was 3.16 in PC 99.

[21.12] Driver correctly reports device capabilities

The driver must correctly support the DEVMODE structure as defined in the Windows 98 DDK and Windows 2000 DDK.

[21.13] Driver supports error notification

At a minimum, the device driver must support notifying the user of errors reported by the hardware.

[21.14] Driver supports sRGB output and has an ICC profile ~~color management~~

Windows 98 and Windows 2000 support using color profiles that comply with the International Color Consortium (ICC) Profile Format specification. The device either must create sRGB output or must embed the ICC profile for the newly acquired image into the image file to identify the color-space information for that image.

For contact information on device profiles, see ~~the references~~"Printer References" at the end of this chapter. The Integrated Color Management (ICM) APIs and functionality ~~for Windows and Windows NT operating systems~~for Windows are described in the Microsoft Platform SDK and the Windows 2000 DDK.

Color-capable devices such as desktop monitors, printers, scanners, still-image cameras, LCDs, color plasma displays, or other flat-panel devices are required to install one or more ICC profiles for ICM. Providing a monitor color-calibration utility is recommended for generating, editing, and installing ICC profiles. The sRGB profile is distributed with Windows 98 and Windows 2000. Devices that are sRGB compliant are not required to associate a profile.

[NEW] Printer meets Delta E tolerance requirements for color matching

For sRGB imaging with perceptual or colorimetric rendering, the following tolerances are required:

?? Mean Square Root (MSR) less than or equal to 45

?? Average Delta E less than or equal to 12

?? Numbers be must lower than "ICM OFF" condition

For non-sRGB image files (for example, G1.8, D50), the following tolerances are required:

?? MSR less than or equal to 55

?? Average Delta E less than or equal to 18

?? Numbers be must lower than “ICM OFF” condition

Note to Reviewers: This new requirement establishes a measurable baseline for testing color matching quality.

[21.15] Port monitor software meets DDK guidelines

Any port monitor or language monitor software provided with a print device must accurately report errors and support bi-directional communication as defined in the Windows 98 DDK and Windows 2000 DDK.

[21.16] Driver supports point-and-print network installation

The user must be able to install a driver from a server by double-clicking on the printer share icon .

[21.17] Device is available immediately following installation

The user must not have to restart the system after device installation in order to print.

[21.18] Device supports accurate printable regions

The printable regions that can be selected in the user interface must be accurately supported in the actual print output.

[21.19] Driver supports required DDIs

Printer drivers must ensure that print commands from Win32- and Win64-based applications are executed correctly on the specified printer or plotter. Because ~~Win32~~these APIs are not hardware-specific, it is the job of each printer driver to interpret the commands for its specific hardware.

For Windows 2000 drivers, the required device driver interfaces (DDIs) are defined in the Windows 2000 DDK — see the “Part 3: Printer Drivers and Spooler Components” in the “Graphics Drivers” section (online at http://www.microsoft.com/DDK/DDKdocs/win98ddk/printer_0o1h.htm).

For Windows 98 drivers, this requirement includes correct support of all features advertised for the device, plus required support for Windows features. The required DDIs for Windows 98 drivers are listed in the “Printer Driver Overview”

section of the Windows 98 DDK (online at http://www.microsoft.com/DDK/DDKdocs/win98ddk/printer_0o1h.htm).

This includes the following support, in addition to other support defined in the DDK:

?? TrueType glyph indexes

?? Big fonts (those that require more than 64K to express)

?? Enhanced metafile (EMF) spooling

?? Bezier curve output

?? Services from the Windows device-independent bitmap (DIB) engine

[NEW] Printer driver does not run in kernel mode

Printer drivers must run only in user mode. Drivers that run in kernel mode can incur stability problems. For driver implementation guidelines, see "Choosing User Mode or Kernel Mode" in the DDK (online at http://www.microsoft.com/DDK/ddkdocs/Win2k/drvarch_2ief.htm).

[21.20] Driver is based on Unidriver

Microsoft provides a universal printer driver (Unidriver) that is capable of carrying out requests such as printing text, rendering bitmaps, or advancing a page on most printer types. To build a driver for a particular printer, a developer builds a minidriver. This minidriver accepts requests from the Graphics Device Interface (GDI)~~and~~ then, in most cases, passes the request to the Unidriver along with information that describes the capabilities, commands, and resident fonts of the particular printer. For more information, see the Windows 2000 DDK and Windows 98 DDK.

Checklist for PC 2001 Printers

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[21.15] Port monitor software meets DDK guidelines

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